

EMISSION STANDARDS FOR NEW 2003 AND LATER SPARK-IGNITION INBOARD AND STERNDRIVE MARINE ENGINES

FINAL REGULATION ORDER

NOTE: This document is written in a style to indicate changes from the existing provisions. All existing language is indicated by plain text. All additions to language are indicated by underlined text. All deletions to language are indicated by ~~strikeout~~. Only those portions containing the suggested modifications from existing provisions are included. All other portions remain unchanged and are indicated by the symbol “* * * *” for reference.

Amendments to Existing Regulation

1. Amend section 2111, Title13, California Code of Regulations, to read as follows:

§ 2111. Applicability.

(a) These procedures shall apply to:

(1) California-certified 1982 and subsequent model-year passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty vehicles, motorcycles, and California-certified 1997 and subsequent model-year off-road motorcycles and all-terrain vehicles, including those federally certified vehicles which are sold in California pursuant to Health and Safety Code section 43102,

(2) California-certified motor vehicle engines used in such vehicles, ~~and~~

(3) California-certified 2000 and subsequent model-year off-road compression-ignition engines, ~~and~~ and

(4) California-certified 2009 and subsequent model-year spark-ignition inboard and sterndrive marine engines.

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NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code.

Reference: Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107, and 43204-43205.5, Health and Safety Code.

2. Amend section 2112 and Appendix A to Article 2.1, Title 13, California Code of Regulations, to read as follows:

§ 2112. Definitions.

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(l) "Useful life" means, for the purposes of this article:

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(23) For 2009 and subsequent model year spark-ignition inboard and sterndrive marine engines, a period of ten years or 480 hours, whichever first occurs.

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**Appendix A
to Article 2.1**

California In-Use Vehicle Emission-Related Recall Procedures, Enforcement Test Procedures, and Failure Reporting Procedures for 1982 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, Heavy-Duty Vehicles and Engines, Motorcycles, 1997 and Subsequent Model-Year Off-Road Motorcycles and All-Terrain Vehicles, ~~and~~ 2000 and Subsequent Model-Year Off-Road Compression-Ignition Engines, and 2009 and Subsequent Model-Year Spark-Ignition Inboard and Sterndrive Marine Engines.

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I. Passenger Car, Light-Duty Truck, Medium-Duty Vehicle, ~~and~~ Motorcycle, and Inboard and Sterndrive Parameters and Specifications.

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NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104, and 43105, Health and Safety Code.

Reference: Sections 39002, 39003, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, and 43204-43205.5, Health and Safety Code.

3. Amend section 2139, Title 13, California Code of Regulations, to read as follows:

§ 2139. Testing.

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(h) For spark-ignition inboard and sterndrive marine engines, in-use compliance tests shall be performed pursuant to section 2442, Title 13, California Code of Regulations. The in-use compliance testing shall use the same test procedure utilized for the specific engine's original certification testing.

(~~h~~i) For any emission in-use compliance test performed pursuant to subsections (a) through (~~g~~h), the ARB may waive a specific test for subsequent vehicle samples if results from vehicle samples already tested are deemed sufficient to establish complying emission levels. The ARB shall inform the manufacturer at least 30 days prior to enforcement testing of its vehicles or engines and shall permit a manufacturer representative to observe the enforcement testing.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code.

Reference: Sections 39002, 39003, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43103, 43104, 43105, 43106, 43107, 43204-43205.5 and 43211-43213 Health and Safety Code.

4. Amend section 2140, Title 13, California Code of Regulations, to read as follows:

§ 2140. Notification and Use of Test Results.

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(b) If the results of the in-use vehicle emission tests conducted pursuant to Section 2139 indicate that the average emissions of the test vehicles for any pollutant exceed the applicable emission standards specified in Title 13, California Code of Regulations, Sections 1960.1, 1961, 1956.8, 1958, 2412, ~~or 2423~~ or 2442, the entire vehicle population so represented shall be deemed to exceed such standards. The Executive Officer shall notify the manufacturer of the test results and upon receipt of the notification, the manufacturer shall have 45 days to submit an influenced recall plan in accordance with Sections 2113 through 2121, Title 13, California Code of Regulations. If no such recall plan is submitted, the Executive Officer may order corrective action including recall of the affected vehicles in accordance with Sections 2122 through 2135, Title 13, California Code of Regulations.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code.

Reference: Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107, 43204-43205.5 and 43211-43213, Health and Safety Code.

5. Amend section 2147, Title 13, California Code of Regulations, to read as follows:

§ 2147. Demonstration of Compliance with Emission Standards.

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(b) A manufacturer may test properly maintained in-use vehicles with the failed emission-related component pursuant to the applicable certification emission tests specified in Title 13, California Code of Regulations, Section 1960.1 or 1961, as applicable, for passenger cars, light-duty trucks and medium-duty vehicles, Section 1956.8 for heavy-duty engines and vehicles, ~~and~~ Section 1958 for motorcycles, and Section 2442 for inboard and sterndrive marine engines. The emissions shall be projected to the end of the vehicle's or engine's useful life using in-use deterioration factors. The in-use deterioration factors shall be chosen by the manufacturer from among the following:

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NOTE: Authority cited: Sections 39600, 39601, and 43105, Health and Safety Code.
Reference: Sections 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

6. Amend section 2440, Title 13, California Code of Regulations, to read as follows:

§ 2440. Applicability.

(a)(1) This article applies to model year 2001 and ~~later subsequent model year~~ spark-ignition marine engines ~~used to propel marine watercraft~~, unless otherwise indicated.

~~(2) Sterndrive and inboard engines are exempt from this article.~~

~~(2)(3)~~ Every new spark-ignition marine engine that is manufactured for sale, sold, or offered for sale in California, or that is introduced, delivered or imported into California for introduction into commerce, and which is subject to any of the standards prescribed in this article must be covered by an Executive Order, issued pursuant to this article.

(3) Spark-ignition inboard and sterndrive marine engines produced by the engine manufacturer to be used solely for competition are exempt from the requirements of this article, except section 2443.1, provided that the marine watercraft in which the engine is installed is designed, built, and used solely for competition. Marine watercraft not registered with a nationally-recognized organization that sanctions professional competitive events or used for amateur or occasional competition do not meet the competition exemption criteria.

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(c)(1) For purposes of this article, military tactical vehicles or equipment means vehicles or equipment owned by the U.S. Department of Defense and/or the U.S. military services and used in combat, combat support, combat service support, tactical or relief operations, or training for such operations.

(2) This article shall not apply to engines used in off-road military tactical vehicles or equipment which have been exempted from regulations under the federal national security exemption, 40 CFR, subpart J, section 90.908, which is incorporated by reference herein. It shall also not apply to those vehicles and equipment covered by the definition of military tactical vehicle that are commercially available and for which a federal certificate of conformity has been issued under 40 CFR Part 91¹, subpart B, which is incorporated by reference herein.

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NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

7. Amend section 2441, Title 13, California Code of Regulations, to read as follows:

§ 2441. Definitions.

(a)

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(4) “Base Fuel Schedule” refers to the fuel calibration schedule programmed into the Engine Control Module or PROM when manufactured or when updated by some off-board source, prior to any learned on-board correction.

~~(4)~~(5) “Capture rate” means the percentage of in-use engines subject to recall which must be corrected to bring the class of engines into compliance. The number of engines subject to recall shall be based on the actual number of engines in use as verified by engine registration records compiled and prepared by industry, or a comparable source as determined by the Executive Officer at the time a recall is initiated.

~~(5)~~(6) “Carryover engine family” means an engine family that undergoes certification using carryover test data from previous model years.

~~(6)~~(7) “Certification” means, with respect to new spark-ignition marine engines, obtaining an Executive Order for an engine family complying with the spark-ignition marine engine exhaust emission standards and requirements specified in Title 13, California Code of Regulations, sections 2442 and 2447.

~~(7)~~(8) “Complete engine assembly” or “complete engine configuration” means an assembly of a basic engine and all of the specific applicable components (e.g., air inlet, fuel and exhaust systems, etc.) and calibrations (e.g., carburetor jet size, valve timing, etc.) required for the assembly to be installed in a new unit of equipment.

(9) “Continuous monitoring” means sampling at a rate no less than two samples per second. If for engine control purposes, a computer input component is sampled less frequently, the value of the component may instead be evaluated each time sampling occurs.

~~(8)~~(10) “Emission control system” means any device, system, or element of design that controls or reduces the emission of substances from an engine.

~~(9)~~(11) “Enforcement test results” means data or information gathered through enforcement programs conducted by the Air Resources Board. These programs include, but are not limited to, field inspections, in-use compliance testing, assembly-line testing.

~~(10)~~(12) “Engine family” means a subclass of a basic engine based on similar emission characteristics. The engine family is the grouping of engines that is used for the purposes of certification.

~~(44)~~(13) "Engine identification number" means a unique specification (for example, model number/serial number combination) that allows each spark-ignition marine engine to be distinguished from other similar engines.

(14) "Engine manufacturer" means the manufacturer granted certification.

(15) "Engine misfire" means lack of combustion in the cylinder due to absence of spark, poor fuel metering, poor compression, or any other cause.

(16) "Engine start" is defined as the point at which normal, synchronized spark and fuel control is obtained or when the engine reaches a speed 150 revolutions per minute (rpm) below the normal, warmed-up idle speed.

~~(42)~~(17) "Exhaust emissions" means matter emitted into the environment from any opening downstream from the exhaust port of a spark-ignition marine engine.

~~(43)~~(18) "Executive Officer" means the Executive Officer of the Air Resources Board or his or her authorized representative.

~~(44)~~(19) "Executive Order" means an order issued by the Executive Officer certifying engines for sale in California.

~~(45)~~(20) "Family Emission Limit" means an emission value assigned by a marine engine manufacturer to an engine family for the purpose of complying with a corporate average exhaust emission standard. The Family Emission Limit (FEL) must not exceed the limit specified in this Article.

~~(46)~~(21) "Fuel system" means all components involved in the transport, metering, and mixture of the fuel from the fuel tank to the combustion chamber(s) including, but not limited to the following: fuel tank, fuel tank cap, fuel pump, fuel lines, oil injection metering system, carburetor or fuel injection components, and all fuel system vents.

(22) "Fuel trim" refers to feedback adjustments to the base fuel schedule. Short-term fuel trim refers to dynamic or instantaneous adjustments. Long-term fuel trim refers to much more gradual adjustments to the fuel calibration schedule than short-term trim adjustments. These long-term adjustments compensate for engine differences and gradual changes that occur over time.

(23) "Functional check" for an output component means verification of proper response to a computer command. For an input component, functional check means verification of the input signal being in the range of normal operation, including evaluation of the signal's rationality in comparison to all available information.

~~(47)~~(24) "Inboard Engine" means a four-stroke spark-ignition marine engine not used in a personal watercraft that is designed such that the propeller shaft

penetrates the hull of the marine watercraft while the engine and the remainder of the drive unit is internal to the hull of the marine watercraft.

~~(48)~~(25) "Inspection criteria" means the pass and fail numbers associated with a particular sampling plan.

(26) "Malfunction" means the inability of an emission-related component or system to remain within design specifications. Further, malfunction refers to the deterioration of any of the above components or systems to a degree that would likely cause the emissions of an aged engine with the deteriorated components or systems present at the beginning of the applicable certification emission test to exceed the HC+NO_x emission standard by more than 50 percent, unless otherwise specified, as applicable pursuant to Chapter 1 (commencing with Section 1900), Division 3, title 13, of the California Code of Regulations.

~~(49)~~(27) "Marine engine manufacturer" means any person engaged in the manufacturing or assembling of new spark-ignition marine engines or the importing of such engines for resale, or who acts for and is under the control of any such person in connection with the distribution of such engines. A spark-ignition marine engine manufacturer does not include any dealer with respect to new spark-ignition marine engines received by such person in commerce.

(28) "Marine warm-up cycle" means sufficient engine operation such that the coolant temperature has risen by at least 40 degrees Fahrenheit from engine starting and reaches a minimum temperature of at least 140 degrees Fahrenheit.

~~(20)~~(29) "Marine watercraft" means every description of boat, ship or other artificial contrivance used, or capable of being operated on water.

~~(24)~~(30) "Model year" means the engine manufacturer's annual new model production period which includes January 1 of the calendar year for which the model year is named, ends no later than December 31 of the calendar year, and does not begin earlier than January 2 of the previous calendar year. Where an engine manufacturer has no annual new model production period, model year means the calendar year.

~~(22)~~(31) "New", for purposes of this Article, means a spark-ignition marine engine or watercraft the equitable or legal title to which has never been transferred to an ultimate purchaser. Where the equitable or legal title to the engine or watercraft is not transferred to an ultimate purchaser until after the engine or watercraft is placed into service, then the engine or watercraft will no longer be new after it is placed into service. A spark-ignition marine engine or watercraft is placed into service when it is used for its functional purposes. With respect to imported spark-ignition marine engines or watercraft, the term A"new" means an engine or watercraft that is not covered by an Executive Order issued under this Article at the time of importation, and that is

manufactured after the effective date of a section in this Article which is applicable to such engine or watercraft, or which would be applicable to such engine or watercraft had it been manufactured for importation into the United States.

~~(23)~~(32) “Nonconformity” or “Noncompliance”, for purposes of Title 13, California Code of Regulations, section 2444.1, means that:

(A) a significant number, determined by the Executive Officer, of a class of engines, although properly maintained and used, experience a failure of the same emission-related component(s) within their useful lives which, if uncorrected, results in the engines’ failure to comply with the emission standards prescribed under section 2442 which are applicable to the model year of such engines; or

(B) a class of engines that at any time within their useful lives, although properly maintained and used, on average does not comply with the emission standards prescribed under section 2442 which are applicable to the model year of such engines.

(33) “Operating cycle” consists of engine startup, engine run, and engine shutoff.

~~(24)~~(34) “Original equipment manufacturer” means a manufacturer who purchases engines for installation in its equipment for sale to ultimate purchasers.

~~(25)~~(35) “Outboard engine” means a spark-ignition marine engine that, when properly mounted on a marine watercraft in the position to operate, houses the engine and drive unit external to the hull of the marine watercraft.

~~(26)~~(36) “Personal watercraft engine” means a spark-ignition marine engine that does not meet the definition of outboard engine, inboard engine or sterndrive engine, except that the Executive Officer may, in his or her discretion, ~~may~~ classify a personal watercraft engine as an inboard or sterndrive engine if it is comparable in technology and emissions to an inboard or sterndrive engine.

~~(27)~~(37) “Production-line tests” are emission tests performed on a sample of production engines produced for sale in California and conducted in accordance with Title 13, California Code of Regulations, section 2446(a).

(38) “Redline engine speed” means the engine manufacturer recommended maximum engine speed as normally displayed on instrument panel tachometers, or the engine speed at which fuel shutoff occurs.

(39) “Response rate,” with regards to oxygen sensors, refers to the delay (measured in milliseconds) between a switch of the sensor from lean to rich

or vice versa in response to a change in fuel/air ratio above and below stoichiometric.

~~(28)~~(40) "Sales" or "Eligible sales" means the actual or calculated sales of an engine family in California for the purposes of corporate averaging and production-line testing. Upon Executive Officer approval, an engine manufacturer may calculate its eligible sales through market analysis of actual federal production or sales volumes.

~~(29)~~(41) "Scheduled maintenance" means any adjustment, repair, removal, disassembly, cleaning, or replacement of components or systems required by the engine manufacturer to be performed on a periodic basis to prevent part failure or marine watercraft or engine malfunction, or those actions anticipated as necessary to correct an overt indication of malfunction or failure for which periodic maintenance is not appropriate.

~~(30)~~(42) "Spark-ignition marine engine" means any engine used to propel a marine watercraft, and which utilizes the spark-ignition combustion cycle; including, but not limited to personal watercraft, outboard, inboard and sterndrive engines.

~~(31)~~(43) "Sterndrive engine" means a four-stroke spark-ignition marine engine not used in a personal watercraft that is designed such that the drive unit is external to the hull of the marine watercraft, while the engine is internal to the hull of the marine watercraft.

~~(32)~~(44) "Test engine" means the engine or group of engines that an engine manufacturer uses during certification, production-line and in-use testing to determine compliance with emission standards.

(45) "Test Procedures" means the document entitled "California Exhaust Emission Standards and Test Procedures for 2001 Model Year and Later Spark-Ignition Marine Engines," which includes the standards and test procedures applicable to 2001 and later spark-ignition personal watercraft, outboard, inboard and sterndrive marine engines, as adopted October 21, 1999 and as amended June 6, 2002. This document is incorporated by reference herein.

~~(33)~~(46) "Ultimate purchaser" means, with respect to any new spark-ignition marine engine, the first person who in good faith purchases such new spark-ignition marine engine for purposes other than resale.

~~(34)~~(47) "U.S.C." means United States Code.

(48) "Used solely for competition" means exhibiting features that are not easily removed and that would render its use other than in competition unsafe, impractical, or highly unlikely.

~~(35)~~(49) "Useful life" for spark-ignition marine engines means nine years for personal watercraft engines and sixteen years for an outboard, ~~engine~~ inboard and sterndrive engines.

~~(36)~~(50) "Warranty period" means the period of time the engine or part is covered by the warranty provisions.

~~(37)~~(51) "Warranty station" means any dealer, service center or other agent that is authorized by the engine manufacturer to perform diagnostic labor, repairs or replacements of warranted engine components.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

8. Amend section 2442, Title 13, California Code of Regulations, to read as follows:

§ 2442. Emission Standards.

(a) Model year 2001 and later model year spark-ignition personal watercraft and outboard marine engines:

(1) Exhaust emissions from new spark-ignition marine engines manufactured for sale, sold, or offered for sale in California, or that are introduced, delivered or imported into California for introduction into commerce must not exceed the hydrocarbon plus oxides of nitrogen (HC+NO_x) exhaust emission standards listed in Table 1 during its designated useful life:

Table 1.

Corporate Average Emission Standards by Implementation Date HC+NO_x (g/kW-hr)			
Model Year	Max. Family Emission Limit (FEL)	P_{tx} < 4.3 kW	P_{tx} = 4.3 kW
<u>2001-2003</u>	Not Applicable	81.00	$(0.25 \times (151+557/P_{tx}^{0.9})) + 6.0$
<u>2004-2007</u>	80	64.80	$(0.20 \times (151+557/P_{tx}^{0.9})) + 4.8$
<u>2008 and Later</u>	44	30.00	$(0.09 \times (151+557/P_{tx}^{0.9})) + 2.1$

where:

P_{tx} is the average power in kilowatts (kW) (sales-weighted) of the total number of spark-ignition marine engines produced for sale in California in model year x. Engine power must be calculated using the Society of Automotive Engineers (SAE) standard J1228, November 1991, incorporated herein by reference. Engine manufacturers must not determine P_{tx} by combining the power outputs of outboard engines with the power outputs of personal watercraft engines.

~~(b)~~(2) An engine manufacturer may comply with the standards directly on an individual engine family basis. Consequently in Table 1, FELs are not applicable for any model year and P_{tx} means the average power in kW (sales-weighted) of the subject engine family produced for sale in California in model year x.

Compliance with the standards on a corporate average basis is determined as follows:

$$\frac{\sum_{j=1}^n (PROD_{jx})(FEL_{jx})(P_{jx})}{\sum_{j=1}^n (PROD_{jx})(P_{jx})} = STD_{ca}$$

where:

n = Total number of engine families (by category)

$PROD_{jx}$ = Number of units each engine family j produced for sale in California in model year x .

FEL_{jx} = The Family Emission Limit (FEL) for engine family j in model year x , which must be determined by the engine manufacturer subject to the following conditions: (1) no individual engine family FEL shall exceed the maximum allowed value as specified in Table 1; (2) no engine family designation or FEL shall be amended in a model year unless the engine family is recertified; and (3) prior to sale or offering for sale in California, each engine family must be certified in accordance with the test procedures referenced in section 2447 and must meet the engine manufacturer's FEL as a condition of the Executive Order. Before certification, the engine manufacturer must also submit estimated production volumes for each engine family to be offered for sale in California.

P_{jx} = The average power in kW (sales-weighted) of engine family j produced for sale in California in model year x . Engine power must be calculated using SAE standard J1228, November 1991, incorporated herein by reference.

STD_{ca} = An engine manufacturer's calculated corporate average HC+NO_x exhaust emissions from those California spark-ignition marine engines subject to the California corporate average HC+NO_x exhaust emission standard determined from Table 1, as established by an Executive Order certifying the California production for the model year. This Executive Order must be obtained prior to the issuance of certification Executive Orders for individual engine families for the model year.

(4)(A) For purposes of compliance under this paragraph, engine manufacturers must not corporate average outboard engine families in combination with personal watercraft engine families.

~~(2)~~(B) During the engine manufacturer's production year, for each engine family, the engine manufacturer shall provide the Executive Officer within 45 days after the last day in each calendar quarter the total number of spark-ignition marine engines produced for sale in California and their applicable FEL(s).

~~(3)~~(C) The Executive Order certifying the California production for a model year must be obtained prior to the issuance of certification Executive Orders for individual engine families for the model year.

~~(4)~~(D) The engine manufacturer's average HC+NO_x exhaust emissions must meet the corporate average standard at the end of the engine manufacturer's production for the model year. At the end of the model year, the manufacturer must calculate a corrected corporate average using sales or eligible sales rather than projected sales.

~~(5)~~(E) Production and sale of spark-ignition marine engines that result in noncompliance with the California standard for the model year shall cause an engine manufacturer to be subject to: revocation or suspension of Executive Orders for the applicable engine families; enjoinder from any further sales, or distribution, of such noncompliant engine families, in the State of California pursuant to section 43017 of the Health and Safety Code; and all other remedies available under Part 5, Division 26 of the Health and Safety Code. Before seeking remedial action against the engine manufacturer, the Executive Officer will consider any information provided by the equipment manufacturer.

~~(6)~~(F) For each model, the engine manufacturer shall submit California sales data ninety (90) days after the end of the model year.

(b) Exhaust emissions from new model year 2003 and later spark-ignition inboard and sterndrive marine engines must not exceed the exhaust emission standards listed in Table 2 for the designated emission durability test period.

Table 2.

<u>Inboard and Sterndrive Exhaust Emission Standards</u> <u>(by Implementation Date)</u>		
<u>Model Year</u>	<u>HC+NO_x</u> (grams per kilowatt-hour)	<u>Durability Test Period</u> (hours)
2003-2008 ¹	16.0 ²	—
2007 and Later ³	5.0	480

1. Engines with a maximum rated power exceeding 373 kilowatts (500 horsepower) are not required to comply with these standards.

2. Compliance with the HC+NO_x standard may be averaged on a sales-weighted basis, across the engine manufacturers' California production, based on projected California sales or the projected California percentage of national sales.
3. For model year 2007, engine manufacturers shall certify a minimum of 45% of their California production (projected California sales or projected California percentage of national sales) to the standard. For model year 2008, engine manufacturers shall certify a minimum of 75% of their California production (projected California sales or projected California percentage of national sales) to the standard.

(1) No crankcase emissions shall be discharged into the ambient atmosphere from 2003 and later spark-ignition inboard and sterndrive marine engines.

(2) Production and sale of spark-ignition marine engines that result in noncompliance with the California standard for the model year shall cause an engine manufacturer to be subject to: revocation or suspension of Executive Orders for the applicable engine families; enjoinder from any further sales, or distribution, of such noncompliant engine families, in the State of California pursuant to section 43017 of the Health and Safety Code; and all other remedies available under Part 5, Division 26 of the Health and Safety Code. Before seeking remedial action against the engine manufacturer, the Executive Officer will consider any information provided by the equipment manufacturer.

(3) For each engine family, the engine manufacturer shall submit the total number of engines produced for sale in California, or the total number of engines produced for sale nationally, ninety (90) days after the end of the model year.

(c) The test equipment and test procedures for determining compliance with these standards are set forth in Parts III and IV, respectively, of the "California Exhaust Emission Standards and Test Procedures for 2001 and Later Spark-Ignition Marine Engines" ("Test Procedures."), adopted October 21, 1999, which are incorporated by reference herein.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

9. Amend section 2443.1, Title 13, California Code of Regulations, to read as follows:

§ 2443.1. Emission Control Labels – Model Year 2001 and Later Spark-Ignition Marine Engines.

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(b) Applicability. This section applies to:

(1) Model year 2001 and later spark-ignition personal watercraft and outboard marine engines and model year 2003 and later spark-ignition inboard and sterndrive marine engines, which have been certified to the applicable emission standards pursuant to Health and Safety Code section 43013;

* * * * *

(c) Engine Label and Location.

(1) A legible label must be welded, riveted or otherwise permanently attached by the engine manufacturer to an area of the engine (e.g., block or crankcase) in such a way that it will be readily visible to the average person after installation of the engine in the watercraft. If such an attachment is not feasible, the Executive Officer may allow the label to be attached on components of the engine or watercraft assembly (as applicable) that satisfy the requirements of Subsection (c)(2)(A) or (c)(2)(B) below, as applicable. Such labels must be attached on all complete engine assemblies that are produced by an engine manufacturer.

(2) (A) Personal Watercraft and Outboard Engines. In selecting an acceptable location, the engine manufacturer must consider the possibility of accidental damage (e.g., possibility of tools or sharp instruments coming in contact with the label). Each engine label must be affixed in such a manner that it cannot be removed without destroying or defacing the label, and must not be affixed to any engine (or watercraft, as applicable) part that is likely to be replaced during the engine's (or watercraft's, as applicable) useful life or that is not integral to the engine's operation. The engine label must not be affixed to any engine (or watercraft as applicable) component that is easily detached from the engine. If the engine manufacturer claims there is inadequate space to attach the label, the Executive Officer will determine a suitable location.

(B) Inboard and Sterndrive Engines. In selecting an acceptable location, the engine manufacturer must consider visibility and the possibility of accidental damage (e.g., possibility of tools or sharp instruments coming in contact with the label). The engine label must be affixed in such a manner that it cannot be removed without destroying or defacing the label. The engine label must contain the unique identification number that has been assigned to the engine, pursuant to subsection (a) of this section. If the

engine manufacturer claims there is inadequate space to attach the label, the Executive Officer will determine a suitable location.

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(4) The engine label must contain the following information:

* * * * *

(l) Engine displacement (in cubic centimeters, cubic inches, or liters) of the individual engine upon which the engine label is affixed.

* * * * *

(5) If there is insufficient space on the engine to accommodate an engine label that contains all of the information in Subsection (4) above, the Executive Officer may allow the engine manufacturer to modify the engine label in one or more of the following ways:

* * * * *

(d) For Inboard and Sterndrive Engines used solely for Competition.

Engines manufactured solely for use in sanctioned competition are not required to comply with the emission standards and other requirements. Manufacturers may incorporate the engine label to identify the engines as produced for competition according to the provisions in this subsection.

(1) A legible label must be welded, riveted or otherwise permanently attached by the engine manufacturer to an area of the engine in such a way that it will be readily visible to the average person after installation of the engine in the watercraft. If such an attachment is not feasible, the Executive Officer may allow the label to be attached on components of the engine that satisfy the requirements of Subsection (d)(2). Such labels must be attached on all complete engine assemblies that are produced by an engine manufacturer.

(2) In selecting an acceptable location, the engine manufacturer must consider visibility and the possibility of accidental damage (e.g., possibility of tools or sharp instruments coming in contact with the label). The engine label must be affixed in such a manner that it cannot be removed without destroying or defacing the label. The engine label must contain the unique identification number that has been assigned to the engine, pursuant to subsection (a) of this section. If the engine manufacturer claims there is inadequate space to attach the label, the Executive Officer will determine a suitable location.

(3) The engine label information must be written in the English language and use block letters (i.e., sans serif, uppercase characters) except for units of

measurement, which may be sans serif, lower-case characters. The characters must be of a color that contrasts with the background of the label.

(4) The engine label must contain the following information:

(A) The heading “**EMISSION CONTROL INFORMATION.**”

(B) The full corporate name or trademark of the engine manufacturer.

(i) An engine manufacturer may request the Executive Officer’s approval to delete its name and trademark, and substitute the name and trademark of another engine manufacturer, original equipment manufacturer or third-party distributor.

(ii) Approval under paragraph (4)(B)(i) above does not relieve the engine manufacturer granted an engine family Executive Order of any requirements imposed by these provisions on the applicable engines.

(C) Date of manufacture (day (optional), month and year).

(D) An unconditional statement of noncompliance with the appropriate model year California regulations. For example, “**THIS ENGINE DOES NOT CONFORM TO (model year) CALIFORNIA EMISSION REGULATIONS FOR SPARK-IGNITION MARINE ENGINES AND MAY NOT BE INSTALLED ON A BOAT FOR ANY PURPOSE OTHER THAN COMPETITION.**”

(E) Engine displacement (in cubic centimeters, cubic inches, or liters) of the individual engine upon which the engine label is affixed.

(de) An engine label may state that such engine conforms to any other applicable state or federal emission standards for new spark-ignition marine engines, or any other information that the engine manufacturer deems necessary for, or useful to, the proper operation and satisfactory performance of the engine.

(ef) Engine identification number. Each engine must have a legible, unique engine identification number permanently affixed to or engraved on the engine.

(fg) Supplemental Engine Label Content and Location for Personal Watercraft and Outboard Engines only.

* * * * *

(gh) As used in ~~these~~ this section, readily visible means that a label is readable by an average person from a distance of 46 centimeters (18 inches) without any obstructions from equipment, watercraft or engine parts (including all engine manufacturer or original equipment manufacturer (as applicable)

available optional equipment) except for flexible parts (e.g., vacuum hoses, ignition wires) that can be moved out of the way without disconnection. Alternatively, the label and engine identification information required by these specifications must be no smaller than two (2) millimeters in height (with the exception of units of measurement) provided that no equipment or engine parts (including all engine manufacturer available optional equipment), except for flexible parts, obstruct the label(s).

(~~h~~i) The label(s), engine identification number(s) and any adhesives used must be designed to withstand, for the engine's or watercraft's useful life, typical environmental conditions in the area where the label(s) required by this section are affixed. Typical equipment environmental conditions include, but are not limited to, exposure to extreme heat or cold, engine fuels, lubricants and coolants (e.g., gasoline, motor oil, saltwater, ethylene glycol). The engine manufacturer must submit, with its certification application, a statement attesting that its labels and engine identification numbers comply with these requirements.

(i) The engine manufacturer must obtain approval from the Executive Officer for all label and engine identification number formats and locations in conjunction with the engine family certification. Approval of specific maintenance settings on labels is not required; however, the format for all such settings and tolerances, if any, is subject to review. If the Executive Officer finds that the information on the label or engine identification number is vague or subject to misinterpretation, or that the location does not comply with these specifications, the Executive Officer may require that the label(s), engine identification number(s) or location(s) be modified accordingly.

(~~j~~k) Samples of all actual production labels used within an engine family must be submitted to the Executive Officer within thirty days after the start of production. Engine manufacturers must provide samples of their own applicable production labels, and samples of applicable production original equipment manufacturer labels that are accessible to the engine manufacturers due to the direct market arrangement between such manufacturers.

(~~k~~l) The Executive Officer may approve alternate label and engine identification number locations. The Executive Officer may also, upon request, waive or modify the label content requirements provided that the intent of this section is met.

(~~m~~)(1) If the Executive Officer finds any engine manufacturer using labels and engine identification numbers that are different from those approved or do not substantially comply with the readability or durability requirements set forth in these specifications, the engine manufacturer will be subject to revocation or suspension of Executive Orders for the applicable engine families and subject to being enjoined from any further sales, or distribution, of such noncompliant engine families, in the State of California pursuant to section 43017 of the Health and Safety Code. Additional penalties may be

assessed to the extent permissible under Part 5, Division 26 of the Health and Safety Code. Before seeking remedial action against the engine manufacturer, the Executive Officer will consider any information provided by the engine manufacturer.

(2) If the Executive Officer finds any original equipment manufacturer using labels for which it has responsibility for attaching that are different from those approved or that do not substantially comply with the readability or durability requirements set forth in these specifications, the equipment manufacturer will be subject to being enjoined from any further sales or distribution of applicable equipment product line that uses noncompliant labels in the State of California pursuant to section 43017 of the Health and Safety Code. Additional penalties may be assessed to the extent permissible under Part 5, Division 26 of the Health and Safety Code. Before seeking remedial action against the equipment manufacturer, the Executive Officer will consider any information provided by the equipment manufacturer.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

10. Amend section 2443.2, Title 13, California Code of Regulations, to read as follows:

§ 2443.2. Consumer/Environmental Label Requirements.

* * * * *

(b) Applicability. This section applies to:

(1) Model year 2001 and later spark-ignition personal watercraft and outboard marine engines and model year 2003 and later spark-ignition inboard and sterndrive marine engines, which have been certified to the applicable emission standards pursuant to Health and Safety Code section 43013;

(2) Federally certified spark-ignition marine engines produced prior to model year 2001 that comply with the emission standards pursuant to section 2442; and

(3) Spark-ignition personal watercraft and outboard marine engines produced prior to model year 2001 and shown by the manufacturer to comply with the emission standards pursuant to section 2442.

(c)

* * * * *

(1) Facsimiles of the label format are shown in Figure 1.

Figure 1



(NOTE: Labels are not to scale.)

* * * * *

(B) Multiple levels of cleanliness. Progressively clean engines shall carry the following notations (as applicable):

(i) An engine that has an FEL or that has been certified at or below the hydrocarbon plus oxides of nitrogen standard listed in Table 1 of this section for Tier 1 must include the phrase “**LOW EMISSION**” and a single star symbol as shown in Figure 1.

(ii) An engine that has an FEL or that has been certified at or below the hydrocarbon plus oxides of nitrogen standard listed in Table 1 of this section for Tier 2 must include the phrase “**VERY LOW EMISSION**” and two star symbols as shown in Figure 1.

(iii) An engine that has an FEL or that has been certified at or below the hydrocarbon plus oxides of nitrogen standard listed in Table 1 of this section for Tier 3 must include the phrase “**ULTRA LOW EMISSION**” and three star symbols as shown in Figure 1.

(iv) An engine that has an FEL or that has been certified at or below the hydrocarbon plus oxides of nitrogen standard listed in Table 1 of this section for Tier 4 must include the phrase “**SUPER ULTRA LOW EMISSION**” and four star symbols as shown in Figure 1.

Table 1.

Hydrocarbon plus Oxides of Nitrogen Standards (in g/kW-hr)		
Tier	P < 4.3	P ≥ ³_{4.3}
1	81.00	$(0.25 \times (151 + 557/P^{0.9})) + 6.0$
2	64.80	$(0.20 \times (151 + 557/P^{0.9})) + 4.8$
3	30.00	$(0.09 \times (151 + 557/P^{0.9})) + 2.1$
<u>4</u>	<u>5.0</u>	<u>5.0</u>

Where P means the average power in kW (sales-weighted) of the subject engine family.

* * * * *

(2) Label location. For outboard engines, a single label must be permanently affixed to the back of the engine cover or cowling. For personal watercraft, a single label must be affixed two or three inches to the right of the required location of the California Assigned Vessel Number displayed on the port side of the hull. For inboard and sterndrive engines, labels must be affixed to the engine and to the port side of the hull, either to the right or left and in close proximity to the required location of the California Assigned Vessel Number. Each label must be manufactured and permanently affixed so that it cannot be removed without destroying or defacing the label, must be readily visible and must not be affixed to any location that is likely to be replaced during the engine's useful life. For the purposes of this paragraph, readily visible means

that the label's shape and number of stars are discernable from a distance of 100 feet.

* * * * *

(4) For Personal Watercraft and Outboard Marine Engines:

* * * * *

(5) For Inboard and Sterndrive Marine Engines:

(A) Labels on Engines. Labels must be affixed to new engines by the engine manufacturer. The engine manufacturer is responsible for ensuring that appropriate environmental labels are properly applied to its engines. Improper labeling or distributing of labels will subject the engine manufacturer to penalties as described in paragraph (h) of this section.

(B) Labels on Watercraft. Labels must be affixed to the port side of watercraft by the watercraft/original equipment manufacturer. The watercraft/original equipment manufacturer is responsible for ensuring that appropriate labels are properly applied to its watercraft. Improper labeling or distributing of hull environmental labels will subject the watercraft/original equipment manufacturer to penalties as described in paragraph (h).

Engine manufacturers are responsible for providing labels that correspond with the engine for all engines supplied to watercraft/original equipment manufacturers. Engine manufacturers also are responsible for providing to the watercraft/original equipment manufacturers instructions regarding label selection and placement. Failure to provide appropriate labels and instructions to the watercraft/original equipment manufacturer will subject the engine manufacturer to penalties as described in paragraph (h) of this section.

* * * * *

(g) Engines that are labeled in accordance with this section and subsequently modified with add-on or modified parts that are not exempted by the Executive Officer, are subject to label removal by an ARB Enforcement Officer or other authorized party.

(h) If the Executive Officer finds any engine manufacturer using labels for which it has responsibility for attaching that are different from those approved or that do not substantially comply with the discernibility or durability requirements set forth in these specifications, the engine manufacturer will be subject to being enjoined from any further sales or distribution, of applicable equipment product line that uses noncompliant labels in the State of California pursuant to section 43017 of the Health and Safety Code. If the

Executive Officer finds any engines or watercraft with labels that are not affixed in accordance with paragraph (c)(1)(B), the engine manufacturer or watercraft/original equipment manufacturer that was responsible for label placement must remove the labels from all affected watercraft and engines and will be subject to being enjoined from any further sales or distribution, of applicable equipment product line that uses noncompliant labels in the State of California pursuant to section 43017 of the Health and Safety Code. Additional penalties may be assessed to the extent permissible under Part 5, Division 26 of the Health and Safety Code. Before seeking remedial action against the engine or equipment manufacturer, the Executive Officer will consider any information provided by the engine or equipment manufacturer.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

11 Amend section 2443.3, Title 13, California Code of Regulations, to read as follows:

§ 2443.3. Environmental Label/Consumer Notification Requirements.

(a) Applicability. This section applies to model year 2001 and later spark-ignition personal watercraft and outboard marine engines and model year 2003 and later spark-ignition inboard and sterndrive marine engines, which have been certified to the applicable emission standard pursuant to Health and Safety Code section 43013.

(b) A nonpermanent label (i.e., hang tag) must be attached to each personal watercraft or outboard engine or watercraft, as applicable, at time of sale. A nonpermanent label (i.e., hang tag) produced and supplied by the engine manufacturer must be attached, by the seller, to each inboard and sterndrive engine or watercraft, as applicable, when introduced for sale to ultimate purchasers. ~~that~~ Environmental labels pursuant to this section shall include a copy of the following:

Front of Hang Tag:

“

The Star Label means Cleaner Marine Engines

This engine has been certified as a:



?



(<Check appropriate box.>)

The Symbol for Cleaner Marine Engines:

Cleaner Air and Water – for a healthier lifestyle and environment.

Better Fuel Economy – burns up to 30-40 percent less gas and oil than conventional carbureted two-stroke engines, saving money and resources.

Longer Emissions Warranty – protects consumer for worry free operation.

“

Back of Hang Tag:

“

<facsimile of the one-star label>

One Star – Low Emission

The one-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2001 exhaust emission standards. Engines meeting these standards have 75% lower emissions than conventional carbureted two-stroke engines. These engines are equivalent to the U.S. EPA's 2006 standards for marine engines.

<facsimile of the two-star label>

Two Stars – Very Low Emission

The two-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2004 exhaust emission standards. Engines meeting these standards have 20% lower emissions than One Star – Low-Emission engines.

<facsimile of the three-star label>

Three Stars – Ultra Low Emission

The three-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2008 exhaust emission standards or the Sterndrive and Inboard marine engine 2003-2008 exhaust emission standards. Engines meeting these standards have 65% lower emissions than One Star – Low Emission engines.

<facsimile of the four-star label>

Four Stars – Super Ultra Low Emission

The four-star label identifies engines that meet the Air Resources Board's Sterndrive and Inboard marine engine 2009 exhaust emission standards. Personal Watercraft and Outboard marine engines may also comply with these standards. Engines meeting these standards have 90% lower emissions than One Star – Low Emission engines.

<White Space for dealer or manufacturer identification or additional information>

Cleaner Watercraft – Get the Facts
1-800-END-SMOG
www.arb.ca.gov

“

(1) Facsimiles of the ~~three~~four environmental labels, as described in section 2443.2(c)(1), with the appropriate label circled or otherwise identified as being applicable to the spark-ignition marine engine, must be displayed on the nonpermanent label. Each facsimile must have dimensions no less than one inch by four-fifths inch.

(2) For outboard engines greater than 130 horsepower, facsimiles of only the “Low Emission Engine” and “Very Low Emission Engine” labels described in sections 2443.2 (c)(1)(B)(i) and (ii) need to be displayed on the nonpermanent label until the earlier of:

(A) the 2004 model year; or

(~~b~~B) the first model year after the date the ARB certifies the first outboard engine family greater than 130 horsepower to the 2008 model year standards.

(3) For personal watercraft, facsimiles of only the “Low Emission Engine” and “Very Low Emission Engine” labels described in sections 2443.2(c)(1)(B)(i) and (ii) need to be displayed on the nonpermanent label until the earlier of:

(A) the 2004 model year; or

(~~b~~B) the first model year after the date the ARB certifies the first personal watercraft engine family to the 2008 model year standards.

* * * * *

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

12. Amend section 2444, Title 13, California Code of Regulations, to read as follows:

§ 2444.1. In-Use Compliance Testing and Recall Regulations – Model Year 2001 and Later Spark-Ignition Marine Engines.

(a) Applicability. This section applies to model year 2001 and later spark-ignition personal watercraft and outboard marine engines, which have been certified to the applicable emission standards pursuant to Health and Safety Code section 43013. Spark-ignition inboard and sterndrive marine engines shall comply with the in-use compliance testing and recall requirements found in Title 13, California Code of Regulations, Sections 2111 through 2140 and 2147.

(b) Manufacturer In-Use Compliance Test Procedures.

* * * * *

(3) California In-Use Testing Program.

* * * * *

(G) Maintenance, Procurement and Testing of In-Use Engines.

(i) A test engine must have a maintenance and use history representative of actual in-use conditions.

~~(a)~~a. The engine manufacturer must obtain information from the end users regarding the accumulated usage, maintenance, operating conditions and storage of the test engines.

~~(b)~~b. Documents used in the procurement process must be maintained as required by section 30 of the Test Procedures.

* * * * *

(d) Voluntary Emission Recalls.

(1) When an engine manufacturer initiates a voluntary emission recall campaign, the Executive Officer shall be notified of the recall at least thirty (30) days before owner notification is to begin. The engine manufacturer shall also submit a voluntary recall plan for approval, as described in paragraph (e) below. A voluntary recall plan shall be deemed approved by the Executive ~~e~~Officer within thirty (30) days after receipt of the recall plan unless objected to in the interim.

* * * * *

(e) Voluntary and Ordered Recall Plans.

(1) The recall plan for voluntary and ordered recalls must be submitted to the Executive Officer for review and must contain the following information unless otherwise specified:

* * * * *

(F) A description of the system by which the engine manufacturer will assure that an adequate supply of parts is available to perform the repair under the plan, including the date by which an adequate supply of parts will be available to initiate the repair campaign, and the method to be used to assure the supply remains both adequate and responsive to engine/watercraft owner demand;

(G) A copy of the letter of notification to be sent to engine/watercraft owners; and

(H) A copy of all necessary instructions to be sent to those persons who are to perform the repair;

(2) For an ordered recall, the recall plan shall include the information required for voluntary recall plans as specified in paragraphs (e)(1). Additionally, it shall include the following:

* * * * *

(4) Record keeping and Reporting Requirements.

* * * * *

(B) If the engine manufacturer determines that any of the information submitted pursuant to paragraph ~~(5)~~(4)(A) above has changed or was incorrect, revised information and an explanation must be submitted. Responses to subsections ~~(5)~~(4)(A)(v), (vi), (vii), (viii) and (ix) above shall be cumulative totals.

* * * * *

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

13. Adopt section 2444.2, Title 13, California Code of Regulation, to read as follows:

§ 2444.2. On-Board Engine Malfunction Detection System Requirements – Model Year 2007 and Later Spark-Ignition Inboard and Sterndrive Marine Engines.

All 2007 and 2008 model year spark-ignition inboard and sterndrive marine engines certified to the 5.0 grams per kilowatt-hour HC+NO_x standard shall comply with the requirements for subsections (a) through (h) below, except as noted. For all 2009 model year and later spark-ignition inboard and sterndrive marine engines, the requirements in *italics* shall also apply.

This section shall be implemented according to the provisions of the following subsections or by means determined by the Executive Officer to be equivalent in meeting the requirements of this section.

(a) General requirements.

(1) Spark-ignition sterndrive and inboard marine engines sold as new shall be equipped with an integrated malfunction detection and notification system, hereinafter known as On-board Diagnostics-Marine (OBD-M) system, to identify emission-related malfunctions of the catalyst, fuel system, primary oxygen sensors used for feedback fuel control, secondary oxygen sensors (if equipped) used for catalyst monitoring, computer-sensed comprehensive components, and the on-board computer itself, by means of diagnostic trouble codes stored in non-volatile computer memory. For this section, a computer-sensed comprehensive component is any electronic device that:

(A) provides information to the on-board computer and significantly impacts emissions when malfunctioning; or

(B) is used to enable or disable any other OBD-M monitoring strategy.

(2) The OBD-M system shall not be required to identify engine misfire unless such monitoring is determined necessary by the Executive Officer to preserve or protect the catalyst system. The Executive Officer shall (as part of the in-water testing and development program to be conducted in conjunction with U.S. EPA, the U.S. Coast Guard, the marine industry, and catalyst manufacturers) identify whether, and to what extent, misfire in spark-ignition inboard and sterndrive marine engines may affect catalyst durability and performance. If the Executive Officer determines that engine misfire is a significant factor in reducing the durability and/or performance of marine catalysts, engine manufacturers shall be required to incorporate appropriate misfire detection diagnostics into the OBD-M system. In that case, the provisions in subsection (b)(5) shall be considered sufficient for satisfying the obligation to monitor misfire. Alternate misfire monitoring strategies shall be considered by the Executive Officer and may be implemented in lieu of subsection (b)(5) if demonstrated by the engine manufacturer to provide an equivalent degree of catalyst protection. Otherwise the provisions of that

subsection shall be voluntary. In making a determination, the Executive Officer shall consider the cost effectiveness of requiring additional monitoring to address the concerns identified by the test program in addition to the leadtime necessary to modify existing hardware and software, to add misfire detection hardware (e.g., sensors) if necessary, and to develop engine-specific calibrations to accommodate misfire monitoring. Notwithstanding, misfire monitoring shall not be required prior to the 2009 model year, and may be delayed beyond that date pending Executive Officer discretion.

(3) The OBD-M system shall not be required to detect any emissions-related malfunction that prevents the engine from starting. The OBD-M system shall not be required to monitor any emissions-related component or system if the only reliable way to accomplish such monitoring would either significantly impair engine/vessel operability or decrease the safety involved with operating the engine/vessel.

(4) OBD-M systems shall have the capability to activate an audio or visual alert device located on the marine vessel to inform vessel occupants in the event of a malfunction, and to transmit diagnostic information locally via a standardized data link connector.

(5) Spark-ignition sterndrive and inboard marine vessels shall be equipped with an audio alert device and/or visual alert device that is compatible with the activation function of the OBD-M system on the installed engine.

(A) If equipped, the audio alert device shall provide sufficient volume and intensity to be readily perceptible to vessel occupants during normal modes of vessel operation and occupant activity, but shall not exceed applicable maximum noise levels as set by authorized federal or State agencies. Further, the audio alert device shall in no way impede the function of required sound-signaling devices, or other safety-related devices, already present on the vessel. The audio alert device shall sound briefly in the engine-run key position before engine cranking to indicate that the audio alert device is functional.

(B) If equipped, the visual alert device shall provide sufficient activation and be located such that it is readily visible under normal lighting conditions, but shall in no way impede the function of any visual distress-signaling device, fog signal, or navigational light. The visual alert device shall activate in the engine-run key position before engine cranking to indicate that the visual alert device is functional and shall, when activated, display the phrase "Service Required" or an equivalent standardized phrase or symbol to be determined as specified in Subsection (g).

(6) Malfunction thresholds for catalyst, fuel system, oxygen sensor, and computer-sensed comprehensive component diagnostics shall be determined by the engine manufacturer. However, the engine manufacturer must

demonstrate that the determination of these thresholds is sufficient for detecting emission-related malfunctions in a timely and meaningful manner subject to Executive Officer approval (see Subsection (e)(2)).

(7) Regarding diagnostic system monitoring and audio/visual alert device activation requirements, engine manufacturers are required to define monitoring conditions that are representative of typical in-use operation, and which will result in the routine execution and completion of all OBD-M diagnostics in-use.

(8) For model years 2007-2008, activation of the audio/visual alert device upon detection of a catalyst, fuel system, or oxygen sensor malfunction shall be optional. However, there are no exemptions from storing diagnostic trouble codes in non-volatile computer memory during these model years for any malfunction. The OBD-M must be capable of fully communicating stored information to a generic scan tool via the standardized data link connector.

(9) Engine manufacturers may employ alternate statistical audio/visual alert device activation and diagnostic trouble code storage protocols to those specified in these requirements, subject to Executive Officer approval, based on comparable timeliness in detecting a malfunction and evaluating system performance.

(10) Should emission control devices/strategies be introduced on the engine in addition to those identified herein as requiring monitoring (e.g., exhaust gas recirculation), the engine manufacturers shall notify the Executive Officer and submit a plan for monitoring the new device/strategy prior to its incorporation into the OBD-M system.

(11) Engine manufacturers may request Executive Officer approval to disable any diagnostic strategy at ambient engine starting temperatures below forty (40) degrees Fahrenheit (low ambient temperature conditions may be determined based on intake air or engine coolant temperature at engine starting), and at elevations above six thousand five hundred (6,500) feet above sea level provided the engine manufacturer submits data and/or an engineering evaluation which adequately demonstrate that monitoring would be unreliable when such conditions exist. Notwithstanding, diagnostic system disablement may be requested at other ambient engine starting temperatures if the engine manufacturer adequately demonstrates with data and/or an engineering evaluation that misdiagnosis would occur due to the impact of such ambient temperatures on the performance of the component itself.

(12) Engine manufacturers may disable individual monitors that can be affected by running out of fuel, provided disablement will not occur when the fuel level is above fifteen percent of the nominal capacity of the fuel tank.

(13) The Executive Officer may grant an extension for compliance with the requirements of this section, with respect to an engine model or engine family, if the engine manufacturer demonstrates that a present electronic control

system cannot be modified in time for the 2007 model year because major design changes, not consistent with the engine manufacturer's projected changeover schedule, would be needed to comply with the provisions of the regulation. The period of extension shall not exceed that period of time necessary to enable modification of the electronic control system in accordance with the engine manufacturer's projected changeover schedule, or a period of two years, whichever first occurs. Engine manufacturers requesting an extension shall, no later than six months prior to the applicable model year, submit to the Executive Officer a written request for exemption, setting forth the required demonstration and specifying the period for which the extension is requested.

(b) Monitoring requirements.

(1) Catalyst monitoring.

(A) Purpose and scope:

(i) The diagnostic system shall monitor the catalyst system on spark-ignited marine engines to ensure that the performance of the catalyst has not been compromised due to engine misfire or other factors that can decrease catalyst durability.

(ii) Manufacturers of spark-ignited lean-burn marine engines may request that the Executive Officer exempt such applications from these catalyst monitoring requirements if it can be demonstrated that a reliable monitoring technology is not available. The Executive Officer shall approve such a request upon determining that all reasonable monitoring technologies have been considered to the extent possible.

(B) Malfunctioning criteria:

(i) The catalyst system shall be considered malfunctioning when the temperature of the measured catalyst(s) exceeds a threshold value, as determined by the engine manufacturer, indicating abnormally high operating temperature; or when the catalyst temperature fails to reach a minimum value, as determined by the engine manufacturer, indicating "light-off" of the catalyst after a manufacturer-specified time interval has elapsed.

(ii) Subject to executive officer approval, alternate malfunction criteria (e.g., correlating oxygen sensor frequencies to catalyst conversion efficiency) may be employed by the engine manufacturer if the alternate criteria are appropriate and would provide for enhanced monitoring capability.

(C) Monitoring conditions:

(i) The engine manufacturer shall define conditions for monitoring the catalyst with the constraints that the check shall:

a. be conducted at the earliest acceptable opportunity encountered after the beginning of each operating cycle; and

b. the monitoring system shall operate at least once per in-use operating cycle during which the engine manufacturer-defined monitoring conditions are met.

(D) Malfunctioning notification and diagnostic trouble code storage:

(i) Upon detection of a catalyst malfunction, the audio/visual alert device shall be activated and a diagnostic trouble code stored no later than the end of the next operating cycle during which monitoring occurs provided the malfunction is again present.

(ii) The diagnostic system shall temporarily disable catalyst monitoring when a malfunction exists that could affect the proper evaluation of catalyst efficiency.

(iii) The monitoring method for the catalyst(s) shall be capable of detecting when a catalyst trouble code has been cleared (except diagnostic system self-clearing), but the catalyst has not been replaced (e.g., catalyst overtemperature approaches may not be acceptable).

(2) Fuel system monitoring.

(A) Purpose and scope: The diagnostic system shall monitor the fuel delivery system for its ability to dynamically adjust fuel delivery.

(B) Malfunction criteria: The engine manufacturer shall establish malfunction criteria to monitor the fuel delivery system. If the engine is equipped with fuel trim circuitry, the engine manufacturer shall include as one of the malfunction criteria the condition where the trim circuitry has used up all of the trim adjustment allowed within the engine manufacturer's selected limit(s). Engine manufacturers may compensate the criteria limit(s) appropriately for changes in altitude or for other similar identifiable operating conditions when they occur.

(C) Monitoring conditions: The fuel system shall be monitored continuously for the presence of a malfunction.

(D) Malfunction notification and diagnostic trouble code storage:

(i) For fuel systems with short-term trim only capability, the diagnostic system shall store a diagnostic trouble code after the fuel system has attained the criteria limit for an engine manufacturer-defined time interval sufficient to determine a malfunction. If the malfunction criteria

limit and time interval are exceeded, the audio/visual alert device shall be activated and a diagnostic trouble code stored no later than the end of the next operating cycle in which the criteria and interval are again exceeded; unless operating conditions similar to those under which the problem was originally detected (manufacturer-defined conditions) have been encountered without such an exceedance, in which case the initial temporary code and stored conditions may be erased. Furthermore, if similar operating conditions are not encountered during forty (40) operating cycles subsequent to the initial detection of a malfunction, the initial temporary code and stored conditions may be erased.

(ii) For fuel systems with long-term fuel trim capability, upon attaining a long-term based malfunction criteria limit independent of, or in combination with, the short-term trim system status, the audio/visual alert device shall be activated and a diagnostic trouble code stored no later than the end of the next operating cycle if the malfunction is again detected. If the malfunction is not detected during the second operating cycle, the audio/visual alert device shall be activated and a diagnostic trouble code stored no later than the next operating cycle in which the malfunction is again detected; unless operating conditions similar to those under which the problem was originally detected (manufacturer-defined conditions) have been encountered without an indication of a malfunction, in which case the initial temporary code and stored conditions may be erased. Furthermore, if similar operating conditions are not encountered during forty (40) operating cycles subsequent to the initial detection of a malfunction, the initial temporary code and stored conditions may be erased.

(3) Oxygen sensor monitoring.

(A) Purpose and scope:

(i) The diagnostic system shall monitor the output voltage and response rate of all primary (fuel control) oxygen (lambda) sensors for malfunction. It shall also monitor secondary oxygen sensors when used as a monitoring device for proper output voltage and/or response rate. Response rate is the time required for the oxygen sensor to switch from lean-to-rich once it is exposed to a richer than stoichiometric exhaust gas mixture or from rich-to-lean when exposed to a leaner than stoichiometric exhaust gas mixture. As a precaution, measuring oxygen sensor switching frequency may not be an adequate indicator of oxygen sensor response rate, particularly at low speeds.

(ii) Either the lean-to-rich or both the lean-to-rich and rich-to-lean response rates shall be checked. Response rate checks shall evaluate the portions of the sensor's dynamic signal that are most affected by sensor malfunctions such as aging or poisoning.

Engine manufacturers may observe the voltage envelope of the sensor when cycled at a frequency of 1.5 Hertz or greater, as determined by the engine manufacturer, to evaluate a slow response rate sensor (i.e., a slow sensor cannot achieve maximum and/or minimum voltage as will a good sensor, given a properly chosen switching frequency and fuel step change for the check). With Executive Officer approval, engine manufacturers may use alternative parameters to comply with this requirement such as voltage ranges and fuel-air switching frequencies based on a determination that the modifications will result in an accurate and timely evaluation of the sensor.

(iii) For sensors with different characteristics, the engine manufacturer shall submit data and an engineering evaluation to the Executive Officer for approval based on showing equivalent evaluation of the sensor.

(B) Malfunction criteria:

An oxygen sensor shall be considered malfunctioning when the voltage, response rate, or other criteria, as determined by the engine manufacturer, are exceeded, or when sensor output characteristics are no longer sufficient (e.g., lack of sensor switching) for use as a diagnostic system monitoring device (e.g., for catalyst efficiency monitoring).

(C) Monitoring conditions:

(i) The engine manufacturer shall define conditions for monitoring the oxygen sensor(s) with the constraints that the check shall:

- a. be conducted at the earliest acceptable opportunity encountered after the beginning of each operating cycle; and
- b. operate at least once per in-use operating cycle during which the engine manufacturer-defined monitoring conditions are met.

(ii) For primary oxygen sensors(s) used for fuel control, the response rate and output voltage shall be monitored for malfunction after the engine has commenced closed-loop operation. If the oxygen sensor(s) is used as part of the monitoring strategy for the catalyst, the oxygen sensor(s) diagnostics should be scheduled to execute before the catalyst diagnostics begin.

(D) Malfunction notification and diagnostic trouble code storage: Upon detection of any oxygen sensor malfunction, the diagnostic system shall store a diagnostic trouble code and the audio/visual alert device shall activate no later than the end of the next operating cycle during which monitoring occurs provided the malfunction is again present.

(4) Computer-sensed comprehensive component monitoring.

(A) Purpose and scope: The diagnostic system shall monitor for malfunction any computer-sensed electronic engine components not otherwise described in this subsection that provide input to (directly or indirectly) the on-board computer, and that: 1) can affect emissions during any reasonable in-use operating condition, or 2) are used as part of the diagnostic strategy for any other monitored system or component.

(i) The monitoring system shall have the capability of detecting, at a minimum, lack of circuit continuity and out of range values to ensure proper operation of the input device. The determination of out of range values shall include logic evaluation of available information to determine if a component is operating within its normal range (e.g., a low throttle position sensor voltage would not be reasonable at a high engine speed with a high mass airflow sensor reading). To the extent feasible, said logic evaluation shall be "two-sided" (i.e., verify a sensor output is not inappropriately high or low).

(ii) Computer-sensed comprehensive components may include, but are not limited to, the engine speed sensor, crank angle sensor, knock sensor, throttle position sensor, coolant temperature sensor, cam position sensor, and other electronic components such as sensors and fuel injectors.

(iii) The coolant temperature sensor shall be monitored for achieving a stabilized minimum temperature level that is needed to achieve closed-loop operation within an engine manufacturer-specified time interval after starting the engine. The time interval shall be a function of starting engine coolant temperature and/or a function of intake air temperature. Engine manufacturers may suspend or delay the diagnostic if the engine is subjected to conditions which could lead to false diagnosis (e.g., engine operation at idle for more than 50 to 75 percent of the warm-up time).

(B) Malfunction criteria:

Computer-sensed comprehensive components shall be considered malfunctioning when, at a minimum, lack of circuit continuity or engine manufacturer-specified out-of-range values occur.

(C) Monitoring conditions:

Computer-sensed components shall be monitored continuously for proper range of values and circuit continuity. For rationality monitoring (where applicable), engine manufacturers shall define appropriate operating conditions that are representative of typical in-use operation

and will result in the routine execution and completion of all diagnostics in-use. Rationality monitoring shall occur at least once per operating cycle during which the engine manufacturer-defined monitoring conditions are met.

(D) Malfunction notification and diagnostic trouble code storage:

Upon detecting a malfunction, the diagnostic system shall store a diagnostic trouble code and activate the audio/visual alert device no later than the end of the next operating cycle during which monitoring occurs provided the malfunction is again detected.

(5) Misfire monitoring.

The provisions in this subsection shall be considered voluntary unless otherwise determined by the Executive Officer according to subsection (a)(2) above.

(A) Purpose and scope: The diagnostic system shall identify the occurrence of engine misfire that can result in damage to the catalyst system. Identification of the misfiring cylinder is not required, however all patterns of misfire must be identified regardless of whether it occurs in a single or multiple number of cylinders.

(B) Malfunctioning criteria: The diagnostic system shall identify a malfunction when the total number of misfires evaluated in 200 crankshaft-revolution increments for each engine speed and load condition exceeds a percentage (determined by the engine manufacturer to cause damage to the catalyst system) of the total number of firing events in each increment. These threshold percentages shall be provided in the certification documentation. Subject to Executive Officer approval, an interval longer than 200 crankshaft-revolutions may be used. The engine manufacturer shall submit in the certification documentation catalyst temperature data versus percent misfire over the full range of engine speed and load conditions. Alternatively, catalyst temperature data may be submitted for every 500 rpm increment along the Propeller Law curve beginning at engine idle and continuing throughout the "Not to Exceed Zone" for marine propulsion engines with Fixed- and Variable-pitch propellers, as defined in 40 CFR, section 94.106, (July 1, 2001), which is incorporated by reference herein. The data shall be obtained from a representative cross section (from small to large displacements) of an engine manufacturer's production. Up to three such engine evaluations shall be documented per engine manufacturer, though an engine manufacturer may submit more data, if desired. An engineering evaluation shall be provided for establishing malfunction criteria for the remainder of engine families in the engine manufacturer's product line. The Executive Officer shall waive the evaluation requirement each year

if, in the judgment of the Executive Officer, technological changes do not affect the previously determined malfunction criteria.

(C) Monitoring conditions:

(i) Monitoring for misfire shall be continuous from engine starting under all steady-state positive torque engine speeds and load conditions.

(ii) As an exception to monitoring misfire during all positive torque operating conditions, engine manufacturers may disable misfire monitoring in the engine operating region bound by the positive torque line (i.e., engine load with the transmission in neutral), and the two following engine operating points:

a. an engine speed of 3,000 rpm with the engine load at the positive torque line; and

b. the redline engine speed (defined in section 2441) with the engine's manifold vacuum at four inches of mercury lower than that at the positive torque line.

Misfire detection systems unable to detect all misfire patterns under all required conditions shall be evaluated for compliance by the Executive Officer based on, but not limited to, the following factors:

c. the magnitude of the region(s) in which misfire detection is limited,

d. the degree to which misfire detection is limited in the region(s) (i.e., the probability of detection of misfire events),

e. the frequency with which said region(s) are expected to be encountered in-use,

f. the type of misfire patterns for which misfire detection is troublesome, and

g. demonstration that the monitoring technology employed is not inherently incapable of detecting misfire under required conditions (i.e., compliance can be achieved on other engines).

The evaluation shall be based on the following misfire patterns:

h. equally spaced misfire occurring on randomly selected cylinders,

i. single cylinder continuous misfire; and

j. paired cylinder (cylinders firing at the same crank angle) continuous misfire.

Further, with Executive Officer approval, the engine manufacturer may disable misfire monitoring or employ higher malfunction criteria when misfire cannot be distinguished from other effects (e.g., turbulence causing the propeller to alternately emerge from then re-submerge into the water.) when using the best reasonably available monitoring technology. The engine manufacturer shall present data and/or an engineering evaluation to the Executive Officer to justify the proposed action. Executive Officer approval shall be based on the extent to which monitoring is expected to be disabled in relation to the capabilities of the best available monitoring technologies as applied to other engines. However, any such disablement occurring within the first 5 seconds after engine starting shall not require Executive Officer approval. Additionally, for engines with greater than eight cylinders, the Executive Officer shall waive the requirements of this section provided the engine manufacturer submits data and/or an engineering evaluation which adequately demonstrates that misfire detection throughout the required operating region cannot be achieved when employing proven monitoring technology (i.e., a technology that provides for compliance with these requirements on other engines) and provided misfire is detected to the fullest extent permitted by the technology.

(D) Malfunction notification and diagnostic trouble code storage:

(i) Upon detection of the level of misfire specified in subsection (b)(5)(B) above, the following criteria shall apply for audio/visual alert device activation and diagnostic trouble code storage:

a. A temporary diagnostic trouble code shall be stored no later than after the third exceedance of the specified misfire level when operating in the region bound by modes 2 through 5 of the spark-ignition marine engine test cycle and no later than after the first exceedance of the specified misfire level when operating at any other engine speed and load condition during a single operating cycle. If the level of misfire is exceeded again (a single exceedance) during the following operating cycle, or the next operating cycle in which similar conditions are encountered (manufacturer defined conditions), the audio/visual alert device shall activate, a diagnostic trouble code shall be stored, and the audio/visual alert device shall remain continuously activated, even if the misfire ceases. The initial temporary code and stored conditions may be erased if misfire is not detected during the following operating cycle and similar conditions have been encountered without an exceedance of the specified misfire level. The code and conditions may also be erased if similar operating conditions are not encountered

during forty operating cycles subsequent to the initial detection of a malfunction.

b. Notwithstanding, in engines that provide fuel shutoff and default fuel control to prevent over fueling during misfire conditions, the audio/visual alert device need not activate provided that the fuel shutoff and default control shall be activated as soon as misfire is detected. Fuel shutoff and default fuel control may be deactivated only to permit fueling outside of the misfire range.

(c) Additional audio/visual alert device activation and diagnostic trouble code storage protocol.

(1) Audio/visual alert device activation: For all emission-related components/systems, upon final determination of a malfunction, the OBD-M system shall activate an audio or visual alert device.

(A) If so equipped, visual alert devices shall remain activated continuously whenever a malfunction has been identified by the OBD-M system, and may be deactivated only according to the provisions in paragraph (2) below, or with a scan tool after appropriate repairs have been effected.

(B) If so equipped, audio alert devices may remain activated continuously when a malfunction has been identified by the OBD-M system; however, the Executive Officer shall consider alternative strategies in which the audio alert is activated on a discontinuous, but repetitive, basis. To be acceptable, discontinuous audio alert strategies must convey a sense of urgency to vessel operators regarding the presence of OBD-M malfunctions.

Upon fulfillment of the standardization processes referred to in subsection (g) below, a protocol for audio alert device activation shall be specified authorizing only discontinuous activation. A standardized notification format is necessary to facilitate consumer association of the audio alert pattern with the identification of an OBD-M malfunction independent of manufacturer or platform. OBD-M system designers are encouraged to cooperate fully with each other and the ARB early on in this endeavor to minimize the redesigning of OBD-M audio alert activation algorithms once a standardized protocol has been finalized.

(C) The diagnostic system shall store a diagnostic trouble code whenever the audio/visual alert device is activated. The diagnostic system shall activate the audio/visual alert device and shall store a diagnostic trouble code whenever the engine enters a default or "limp home" mode of operation. The diagnostic system shall activate the audio/visual alert device and shall store a diagnostic trouble code whenever the engine control system fails to enter closed-loop

operation (if employed) within an engine manufacturer specified minimum time interval.

(2) Audio/visual alert device deactivation:

(A) *Misfire and Fuel System Malfunctions*: For *misfire* or fuel system malfunctions, the audio/visual alert device may be deactivated if the fault does not recur when monitored during three subsequent sequential operating cycles in which conditions are similar to those under which the malfunction was first determined.

(B) All Other Malfunctions: For all other faults, the audio/visual alert device may be deactivated after three subsequent sequential operating cycles during which the monitoring system responsible for activating the audio/visual alert device functions without detecting the malfunction and if no other malfunction has been identified that would independently activate the audio/visual alert device according to the requirements outlined above.

(3) Erasing a diagnostic trouble code: The diagnostic system may erase a diagnostic trouble code if the same fault is not re-registered in at least forty (40) engine warm-up cycles, and the audio/visual alert device is not activated for that diagnostic trouble code.

(d) Tampering protection: Computer-coded engine operating parameters shall not be changeable without the use of specialized tools and procedures (e.g. soldered or potted computer components or sealed (or soldered) computer enclosures). Subject to Executive Officer approval, engine manufacturers may exempt from this requirement those product lines that are unlikely to require protection. Criteria to be evaluated in making an exemption include, but are not limited to, current availability of performance chips, high performance capability of the engine, and sales volume.

(e) Certification documentation: The engine manufacturer shall submit the following documentation for each engine family at the time of certification. With Executive Officer approval, one or more of the documentation requirements specified in this section may be waived or altered if the information required would be redundant or unnecessarily burdensome to generate:

(1) A written description of the functional operation of each monitoring strategy within the diagnostic system.

(2) A table providing the following information for each monitored component or system (either computer-sensed or -controlled) of the emission control system:

(A) corresponding diagnostic trouble code.

(B) monitoring method or procedure for malfunction detection.

(C) primary malfunction detection parameter and its type of output signal.

(D) fault criteria limits used to evaluate output signal of primary parameter.

(E) other monitored secondary parameters and conditions (in engineering units) necessary for malfunction detection.

(F) monitoring time length and frequency of checks.

(G) criteria for activating the audio/visual alert device.

(3) A logic flowchart describing the general method of detecting malfunctions for each monitored emission-related component or system. To the extent possible, abbreviations in SAE J1930 "Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms," May 1998, shall be used. J1930 is incorporated by reference herein. The information required in the chart under (2) above may instead be included in this flow chart, provided all of the information required in (2) is included.

(4) A listing and block diagram of the input parameters used to calculate or determine calculated load values and the input parameters used to calculate or determine fuel trim values.

(5) Any other information determined by the Executive Officer to be necessary to demonstrate compliance with the requirements of this section.

(f) Confirmatory testing: The ARB may perform confirmatory testing of engine manufacturers' diagnostic systems for compliance with requirements of this section in accordance with malfunction criteria submitted in the engine manufacturer's approved certification documentation. The ARB or its designee may install appropriately deteriorated or malfunctioning components in an otherwise properly functioning test engine (or simulate a deteriorated or malfunctioning component response) in order to test the fuel system, oxygen sensor, catalyst system, and misfire (if applicable) monitors for compliance with the applicable constraints in this section. Diagnostic systems of a representative sample of engines that uniformly fail to meet the requirements of this section may be recalled for correction.

(g) Standardization: The spark-ignition inboard and sterndrive marine industry, in cooperation with ARB, will develop and adhere to standardized specifications for the implementation of OBD-M, including diagnostics trouble code formats, communication, and scan tool protocols.

(h) Implementation schedule.

(1) These OBD-M requirements, unless otherwise specified, shall be implemented beginning with the 2007 model year.

(2) All engine manufacturers shall meet these requirements by the 2009 model year.

(3) The Executive Officer, upon receipt of an application from the engine manufacturer, may certify the engines in question even though said engines may not comply with one or more of the requirements of these subsections. Such certification is contingent upon the extent to which these requirements are satisfied overall on the engine applications in question and a demonstrated good-faith effort to meet these requirements in full by evaluating and considering the best available monitoring technology. Each incident of non-compliance will be recorded as a deficiency.

(A) Engine manufacturers of non-complying systems shall be subject to fines pursuant to section 43016 of the California Health and Safety Code for each deficiency identified subject to the following limitations:

(i) The specified fines shall apply to the third and subsequently identified deficiencies, with the exception that fines shall apply to all monitoring system deficiencies wherein a required monitoring strategy is completely absent from the OBD-M system; and

(ii) Engine manufacturers may not carry over monitoring system deficiencies for more than two model years unless it can be adequately demonstrated that substantial engine hardware modifications and additional lead time beyond two years would be necessary to correct the deficiency, in which case the deficiency may be carried over for three model years.

(B) For the third deficiency and every deficiency thereafter identified in an engine model, the fines shall be in the amount of \$25 per deficiency per engine for non-compliance with any of the monitoring requirements specified in this section. Total fines per engine under this section shall not exceed \$250 per engine and shall be payable to the State Treasurer for deposit in the Air Pollution Control Fund.

NOTE: Authority cited: Sections 39515, 39600, 39601, 43013, 43018, 43104, and 44036.2, Health and Safety Code; Sections 27156 and 38395, Vehicle Code. Reference: Sections 39002, 39003, 39667, 43000, 43004, 43008.6, 43013, 43016, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204, and 44036.2, Health and Safety Code; Sections 27156, 38391, and 38395, Vehicle Code.

14. Amend section 2445.1, Title 13, California Code of Regulations, to read as follows:

§ 2445.1. Defects Warranty Requirements for Model Year 2001 and Later Spark-Ignition Marine Engines.

(a) Applicability. This section applies to model year 2001 and later spark-ignition personal watercraft and outboard marine engines, and to model year 2003 and later spark-ignition inboard and sterndrive marine engines. The warranty period begins on the date the engine or equipment is delivered to an ultimate purchaser or first placed into service (e.g., a demonstration engine or watercraft).

* * * * *

(c) Warranty Period. In the case of all new, spark-ignition marine engines, the warranty period will be:

(1) For model year 2001 and later spark-ignition personal watercraft and outboard marine engines, a period of 4 years or 250 hours of use, whichever occurs first.

(2) For model year 2003-2008 spark-ignition inboard and sterndrive marine engines, a period of 2 years.

(3) For model year 2009 and later spark-ignition inboard and sterndrive marine engines, a period of 3 years.

* * * * *

(g) Exclusions.

* * * * *

(2) Engine manufacturers must warrant engines for the yearly warranty period specified in paragraph (c). For Outboard and Personal Watercraft engines, manufacturers may warrant engines for the hour warranty period if ~~unless~~ the engines:

* * * * *

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

15. Amend section 2445.2, Title 13, California Code of Regulations, to read as follows:

§ 2445.2. Emission Control Warranty Statements.

(a) Each engine manufacturer must provide a verbatim copy of the following statement with each new 2001 model year and later spark-ignition personal watercraft and outboard marine engine and with each new 2003 model year and later spark-ignition inboard and sterndrive marine engine, using those portions of the statement applicable to the engine.

**CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS**

The California Air Resources Board (and engine manufacturer's name, optional) is (are) pleased to explain the emission control system warranty on your (model year) (inboard, sterndrive, outboard or personal watercraft) engine. In California, new (inboard, sterndrive, outboard, or personal watercraft) engines must be designed, built and equipped to meet the State's stringent anti-smog standards. (Engine manufacturer's name) must warrant the emission control system on your (inboard, sterndrive, outboard, or personal watercraft) engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your (inboard, sterndrive, outboard, or personal watercraft) engine.

Your emission control system may include parts such as the carburetor or fuel injection system, the ignition system, and catalytic converter. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, (engine manufacturer's name) will repair your (inboard, sterndrive, outboard, or personal watercraft) engine at no cost to you, including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE:

(For spark-ignition personal watercraft and outboard marine engines:)
Select emission control parts from model year 2001 and later
(outboard, or personal watercraft) engines are warranted for 4 years,
or for 250 hours of use, whichever occurs first.

(For 2003-2008 spark-ignition inboard and sterndrive marine engines:)
Select emission control parts from model year 2003-2008 (inboard or sterndrive) engines are warranted for 2 years.

(For 2009 and later spark-ignition inboard and sterndrive marine engines:) Select emission control parts from model year 2009 and later (inboard or sterndrive) engines are warranted for 3 years.

However, warranty coverage based on the hourly period is only permitted for outboard engines and personal watercraft equipped with appropriate hour meters or their equivalent. If any emission-related part on your engine is defective under warranty, the part will be repaired or replaced by (engine manufacturer's name).

OWNER'S WARRANTY RESPONSIBILITIES:

- As the (inboard, sterndrive, outboard, or personal watercraft) engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. (Engine manufacturer's name) recommends that you retain all receipts covering maintenance on your (inboard, sterndrive, outboard, or personal watercraft) engine, but (engine manufacturer's name) cannot deny warranty solely for the lack of receipts or your failure to ensure the performance of all scheduled maintenance.
- As the (inboard, sterndrive, outboard, or personal watercraft) engine owner, you should however be aware that (engine manufacturer's name) may deny you warranty coverage if your (inboard, sterndrive, outboard, or personal watercraft) engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- You are responsible for presenting your (inboard, sterndrive, outboard, or personal watercraft) engine to a (engine manufacturer's name) distribution center as soon as a problem exists. The warranty repairs will be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact (Insert chosen contact of engine manufacturer) at 1-XXX-XXX-XXXX.

* * * * *

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

16. Amend section 2446, Title 13, California Code of Regulations, to read as follows:

§ 2446. 2001 and ~~Subsequent~~ Later Model Year Production-Line Test Procedures and Selective Enforcement Auditing Regulations for Spark-Ignition Marine Engines.

(a) Applicability. This section applies to 2001 and ~~subsequent~~ later spark-ignition personal watercraft and outboard marine engines. The allowable methods of production-line testing are specified in ~~paragraphs~~ subsections (b) and (c), unless the engine manufacturer can satisfactorily provide an alternate method that shows an equivalent assurance of compliance to that of ~~paragraph~~ subsection (b). The engine manufacturer must choose only one method for each model year and submit its method of production-line testing to the Executive Officer for approval no later than 90 days prior to the start of the subject model year production. The 2003 and later spark-ignition inboard and sterndrive marine engines are only subject to the selective enforcement audit requirements specified within subsections (d) and (e) of this section.

(b) 2001 and ~~Subsequent~~ Later Model Year Quality-Audit Production Line Test Procedures.

(1) Engine Sample Selection.

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(2) Alternate Quality-Audit Engine Selection Criteria ~~for~~ 2001 and ~~Subsequent~~ Later Model Years.

* * * * *

(E) If the expression is greater than C in Table 2 below, and the engine manufacturer reasonably estimates that the quarterly engine family production will exceed 5,000 engines or units of equipment, the sampling rate for the remaining portion of the calendar month following the date of selection of the last of the 10 engines or equipment is 10 per month, applied on a prorated basis. If the expression is greater than C in Table 2 below, and the engine manufacturer reasonably estimates that the quarterly engine family production will be 5,000 engines or units of equipment or less, the sampling rate for the remaining portion of the calendar month following the date of selection of the last of the 10 engines or equipment is 5 per month, applied on a prorated basis. If the expression is equal to or less than C in Table 2, the sampling rate continues to be 1.0 percent of production for the remaining portion of the month in which selection of the 10 engines or equipment is completed. The value of C is a function of the coefficient of variation (standard deviation/mean). The coefficient of variation and

"C" must be rounded to the number of decimal places shown in Table 2.

* * * * *

(3) Compliance Evaluation.

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(4) Reports.

* * * * *

(B) The quarterly report shall include the following:

* * * * *

(ii) ~~e~~ Engine identification numbers and explanation of the identification code.

* * * * *

(c) 2001 and Later Model Year Cumulative Sum Production-Line Test Procedures.

(1) Engine Sample Selection.

(A) At the start of each model year, the engine manufacturer will begin to randomly select engines from each engine family with California sales greater than 20 units for production line testing, according to the criteria specified herein.

* * * * *

(iv) ~~(a)~~a. Prior to the beginning of the 2001 model year, if an engine manufacturer cannot provide actual California sales data, it must provide its total production and an estimate of California sales at the end of the model year. The engine manufacturer must also provide supporting material for its estimate.

~~(b)~~b. For the 2001 and later model years, engine manufacturers must provide actual California sales, or other information acceptable to the Executive Officer, including, but not limited to, an estimate based on market analysis and federal production or sales.

(B)(i) Engine manufacturers must calculate the required sample size for the model year for each engine family using the Sample Size Equation below. N is calculated from each test result. The number N

indicates the number of tests required for the model year for an engine family. N is recalculated after each test. Test results used to calculate the variables in the Sample Size Equation must be final deteriorated test results as specified in paragraph (c)(3)(C).

$$N = \left[\frac{(t_{95} * S)}{(x - FEL_{jx})} \right]^2 + 1$$

where:

N = Required sample size for the model year.

T₉₅ = 95% confidence coefficient. It is dependent on the actual number of tests completed, n, as specified in the table in paragraph (c)(1)(B)(ii) of this section. It defines one-tail, 95% confidence intervals.

FEL_{jx} = Family Emission Limit

s = Actual test sample standard deviation calculated from the following equation:

$$s = \sqrt{\frac{\sum (X_i - x)^2}{n - 1}}$$

where:

X_i = Emission test results for an individual engine

x = Mean of emission test results of the actual sample

n = The actual number of tests completed in an engine family

* * * * *

(2) Calculation of the Cumulative Sum Statistic.

- (A) Each engine manufacturer must review the test results obtained in paragraph (c)(1) using the following procedure:
 - (i) Engine manufacturers must construct the following Cumulative Sum Equation for each regulated pollutant for each engine family. Test results used to calculate the variables in the Cumulative Sum Equation must be final deteriorated test results as defined in paragraph (c)(3)(C).

$$C_i = \max[0 \text{ or } (C_{i-1} + X_i - (FEL_{jx} + F))]$$

where:

C_i	= The current Cumulative Sum statistic
C_{i-1}	= The previous Cumulative Sum statistic. Prior to any testing, the Cumulative Sum statistic = 0 (i.e., $C_0 = 0$)
X_i	= The current emission test result for an individual engine
FEL_{jx}	= Family Emission Limit
F	= $0.25 \times s$

After each test, C_i is compared to the action limit, H , the quantity that the Cumulative Sum statistic must exceed, in two (2) consecutive tests, before the engine family may be determined to be in noncompliance for purposes of paragraphs (a)(2)(A)(iv) and (a)(2)(A)(v).

H	= The Action Limit. It is $5.0 \times s$ and is a function of the standard deviation, s .
s	= is the The sample standard deviation and is recalculated after each test.

* * * * *

(v) An engine family may be determined to be in noncompliance, if, at any time throughout the model year, the Cumulative Sum statistic, C_i , for, a regulated pollutant is greater than the action limit, H , for two (2) consecutive tests.

* * * * *

(3) Calculation and Reporting of Test Results.

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(E) Within 45 calendar days of the end of each quarter, each engine manufacturer must submit to the Executive Officer a report that includes the following information:

- (i) The location and description of the engine manufacturer's or other's exhaust emission test facilities that were utilized to conduct testing reported pursuant to this section;
- (ii) Total production and sample sizes, N and n , for each engine family;
- (iii) The applicable emission standards for each engine family;
- (iv) A description of the process to obtain engines on a random basis;
- (v) A description of the test engines or equipment (i.e., date of test, engine family, engine size, engine or equipment identification number,

fuel system, dynamometer power absorber setting in horsepower or kilowatts, engine code or calibration number, and test location);

(vi) The date of the end of the engine manufacturer's model year production for each engine family;

(vii) For each test conducted,

~~(a)~~a. A description of the test engine, including:

~~(4)~~1. Configuration and engine family identification,

~~(2)~~2. Year, make, and build date,

~~(3)~~3. Engine identification number and explanation of the identification code, and

~~(4)~~4. Number of hours of service accumulated on engine prior to testing.

~~(b)~~b. Location where service accumulation was conducted and description of accumulation procedure and schedule;

~~(c)~~c. Test number, date, test procedure used, initial test results before and after rounding, and final test results for all exhaust emission tests, whether valid or invalid, and the reason for invalidation, if applicable;

~~(d)~~d. The exhaust emission data for CO, NO_x and HC for each test engine or watercraft. The data reported must provide two (2) significant figures beyond the number of significant figures in the applicable emission standard.

~~(e)~~e. The retest emissions data, as described in paragraph ~~(a)(4)(b)(4)(B)(vi)~~ (a)(4)(b)(4)(B)(vi) of this section, for any engine or watercraft failing the initial test, and description of the corrective measures taken, including specific components replaced or adjusted.

~~(f)~~f. A complete description of any adjustment, modification, repair, preparation, maintenance, and/or testing that was performed on the test engine, was not reported pursuant to any other part of this article, and will not be performed on all other production engines;

~~(g)~~g. A Cumulative Sum analysis, as required in paragraph ~~(a)(2)(c)(2)(A)(i)~~ (a)(2)(c)(2)(A)(i) of this section, of the production line test results for each engine family;

~~(h)~~h. Any other information the Executive Officer may request relevant to the determination whether the new engines being manufactured by the engine manufacturer do in fact conform with the regulations with respect to which the Executive Order was issued;

(viii) For each failed engine as defined in paragraph (vii)(d), above, a description of the remedy and test results for all retests;

(ix) Every aborted test data and reason for the aborted test;

(x) The start and stop dates of batch-produced engine family production; and

(xi) The required information for all engine families in production during the quarter regardless of sample size; and.

* * * * *

(d) Test Procedures Applicable to All Production-Line and Selective Enforcement Audit Testing.

(1) Standards and Test Procedures. The emission standards, exhaust sampling and analytical procedures are those specified in Section 2442. The exhaust sampling and analytical procedures are those described in the Test Procedures. An engine is in compliance with the production-line or selective enforcement audit standards and test procedures only when all portions of the production-line or selective enforcement audit test procedures and requirements specified in Part IV of the Test Procedures are fulfilled, except that any adjustable engine parameters must be set to any value or position that is within the range available to the ultimate purchaser.

* * * * *

(3) Engine Preparation and Preconditioning.

(A) No emissions tests may be performed on an engine before the first production-line test or selective enforcement audit test on that engine.

(B) The engine or watercraft must be tested after the engine manufacturer's recommended break-in period. The engine manufacturer must submit to the Executive Officer the schedule for engine break-in and any changes to the schedule with each quarterly report. This schedule must be adhered to for all production-line testing, or as required by the Executive Officer for selective enforcement audit testing, within an engine family and subgroup or engine family and assembly plant as appropriate.

(C) If an engine or watercraft is shipped to a remote facility for production-line or selective enforcement audit testing, and adjustment or repair is necessary because of such shipment, the engine manufacturer must perform the necessary adjustments or repairs only after the initial test of the engine or watercraft. Engine manufacturers

must report to the Executive Officer in the quarterly report for all production-line testing, or as required by the Executive Officer for selective enforcement audit testing, all adjustments or repairs performed on engines or watercraft prior to each test. In the event a retest is performed, a request may be made to the Executive Officer, within ten days of the production quarter, for permission to substitute the after-repair test results for the original test results. The Executive Officer will either affirm or deny the request by the engine manufacturer within ten working days from receipt of the request.

(D) If an engine manufacturer determines that the emission test results of an engine or watercraft are invalid, the engine or equipment must be retested. Emission results from all tests must be reported. The engine manufacturer must include a detailed report on the reasons for each invalidated test in the quarterly report for all production-line testing, or as required by the Executive Officer for selective enforcement audit testing.

(4) Manufacturer Notification of Failure.

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(5) Suspension and Revocation of Executive Orders.

(A) The Executive Order is automatically suspended with respect to any engine failing pursuant to paragraph (b)(3)(D) or (c)(2)(A)(iv) or whose test results for a regulated pollutant exceed the emission standards effective from the time that testing of that engine is completed.

* * * * *

(F) The Executive Officer may revoke an Executive Order for an engine family after the Executive Order has been suspended pursuant to paragraphs (d)(5)(B) or (C) of this section if the proposed remedy for the nonconformity, as reported by the engine manufacturer to the Executive Officer, is one requiring a design change or changes to the engine and/or emission control system as described in the application for certification of the affected engine family.

* * * * *

(e) Selective Enforcement Auditing Regulations.

(1) Test Orders.

* * * * *

(3) Sample selection.

* * * * *

(B) The engine manufacturer must produce and assemble the test engines of the family selected for testing using its normal production and assembly process for engines to be distributed into commerce. If, between the time the engine manufacturer is notified of a test order and the time the engine manufacturer finishes selecting test engines, the engine manufacturer implements any change(s) in its production or assembly processes, including quality control, which may reasonably be expected to affect the emissions of the engines selected, then the engine manufacturer must, during the audit, inform the Executive Officer of such changes. If the test engines are selected at a location where they do not have their operational and emission control systems installed, the test order will specify the manner and location for selection of components to complete assembly of the engines. The engine manufacturer must assemble these components onto the test engines using normal assembly and quality control procedures as documented by the engine manufacturer.

* * * * *

(4) Test procedures.

* * * * *

(B)(i) The engine manufacturer may not adjust, repair, prepare, or modify the engines selected for testing and may not perform any emission tests on engines selected for testing pursuant to the test order unless this adjustment, repair, preparation, modification, and/or tests are documented in the engine manufacturer's engine assembly and inspection procedures and are actually performed or unless these adjustments and/ or tests are required or permitted under this subsection or are approved in advance by the Executive Officer.

(ii) The Executive Officer may adjust or cause to be adjusted any engine parameter that the Executive Officer determines subject to adjustment for certification and Selective Enforcement Audit testing in accordance with Part I, section 18 of the Test Procedures, ~~adopted October 21, 1999, and incorporated by reference herein,~~ to any setting within the physically adjustable range of that parameter, as determined by the Executive Officer in accordance with section 18, prior to the performance of any tests. However, if the idle speed parameter is one which the Executive Officer has determined to be subject to adjustment, the Executive Officer may not adjust it to any setting that causes a lower engine idle speed than would have been possible within the physically adjustable range of the idle speed parameter if the engine manufacturer had accumulated 12 hours of service on the engine under paragraph (C) of this section, all other parameters being

identically adjusted for the purpose of the comparison. The engine manufacturer may be requested to supply information needed to establish an alternate minimum idle speed. The Executive Officer, in making or specifying these adjustments, may consider the effect of the deviation from the engine manufacturer's recommended setting on emission performance characteristics as well as the likelihood that similar settings will occur on in-use engines. In determining likelihood, the Executive Officer may consider factors such as, but not limited to, the effect of the adjustment on engine performance characteristics and information from similar in-use engines.

(C) Service Accumulation. Before performing exhaust emission testing on a selective enforcement audit test engine, the engine manufacturer may accumulate on each engine a number of hours of service equal to the greater of 12 hours or the number of hours the engine manufacturer accumulated during certification on the emission data engine corresponding to the family specified in the test order.

(i) Service accumulation must be performed in a manner using good engineering judgment to obtain emission results representative of normal production engines. This service accumulation must be consistent with the new engine break-in instructions contained in the applicable owner's manual.

(ii) The engine manufacturer must accumulate service at a minimum rate of 6 hours per engine during each 24-hour period, unless otherwise approved by the Executive Officer.

~~(a)~~a. The first 24-hour period for service begins as soon as authorized checks, inspections, and preparations are completed on each engine.

~~(b)~~b. The minimum service accumulation rate does not apply on weekends or holidays.

~~(c)~~c. If the engine manufacturer's service or target is less than the minimum rate specified (6 hours per day), then the minimum daily accumulation rate is equal to the engine manufacturer's service target.

(iii) Service accumulation must be completed on a sufficient number of test engines during consecutive 24-hour periods to assure that the number of engines tested per day fulfills the requirements of paragraphs (G)(i) and (G)(ii) of this section below.

* * * * *

(J) An engine manufacturer must test engines with the test procedure specified in Part IV of the Test Procedures to demonstrate compliance

with the exhaust emission standard (or applicable FEL) for HC+NO_x. If alternate procedures were used in certification pursuant to Part 1, section 20(c) of the Test Procedures, ~~adopted October 21, 1999 and incorporated by reference herein,~~ then those alternate procedures must be used.

(5) Compliance with acceptable quality level and passing and failing criteria for selective enforcement audits.

* * * * *

(B) A failed engine is one whose final test results for HC+NO_x pursuant to paragraph (b)(3)(D) or (c)(2)(iv), as applicable, exceed the applicable family emission level or whose test results for a regulated pollutant exceed the emission standards.

* * * * *

(D) The pass and fail decision numbers associated with the cumulative number of engines tested are determined by using the tables in Appendix A to this subsection (e), "ASampling Plans for Selective Enforcement Auditing of Spark-Ignition Marine Engines," appropriate to the projected sales as made by the engine manufacturer in its report to ARB under paragraph (b)(4) or (c)(3)(A). In the tables in Appendix A to this subsection, sampling plan "Astage" refers to the cumulative number of engines tested. Once a pass or fail decision has been made for HC+NO_x, the number of engines with final test results exceeding the emission standard for HC+NO_x shall not be considered any further for the purposes of the audit.

* * * * *

(F) The Executive Officer may terminate testing earlier than required in paragraph (C) upon either a manufacturers' or Executive Officer's admission that further testing would not change the pass/fail decision.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.